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## NOTE

ON THE

# SUGARCANE DISEASE

KNOWN AS

Rind Fungus, Red Patch, or Red Smut



ALLAHABAD.

NOTES

### Note on the sugarcane disease known as rind fungus, red patch or red smut.

THE sugarcane disease caused by the fungus *Trichosphaeria Sacchari* is known in these Provinces under different local names, viz., *Lawah, Lanha, Ukhra, Uktha, Uytho, Umsa, Aga, Sukha, Sukundi, Rutar, Ramirdda* and *Kantar*.

The history of the disease is obscure. No one seems to know how it originated, and the conditions under which it makes its appearance are but imperfectly understood.

The varieties of cane grown in the United Provinces may be classified arbitrarily under three broad divisions, viz. —

(1) The *PAUNDA* varieties which are very soft and juicy, have generally a thick stem with broad leaves, and are grown mainly for chewing.

(2) The *UKH* varieties which are very hard, yielding a relatively small percentage of juice and having a thin stem and narrow leaves. They are cultivated almost entirely for production of sugar.

(3) The *KARARA* varieties which are intermediate between the last two, being richer in juice and having a softer pith, broader leaves, and thicker stems than the *Ukh* varieties, but are less soft and juicy and have narrow leaves and thinner stems than the *Paunda* varieties. Except in parts of the Meerut and the whole of the Rohilkhand divisions and in the districts of Gorakhpur, Ballia, and Champur, where these varieties are grown for extraction of sugar and on a fairly large scale, they are cultivated chiefly to be used for chewing, and the area occupied by them in the tracts other than those just mentioned is a comparatively insignificant growing tract in which one or the other of the *Karara* varieties does not take

up a small portion of the cane area. The main local varieties belonging to this class are —

- (1) The "Gagaul," "Merthi" or "Bareilly" variety of Meerut and Muzaffarnagar.
- (2) The Agaul or Agraul variety of Bareilly, Moradabad, and Pilibhit
- (3) The Dikohan variety of Shahjahanpur and Hardoi
- (4) Baraukha variety of Azamgarh (which is totally different from the Baraukha of the Doab and the Fyzabad Division).
- (5) The Pausahi varieties of Gorakhpur
- (6) The *Katara* of Oudh and the Central and Eastern Doab.

So far only the *Katara* varieties appear to have been affected by the rind fungus (*Trichosphaeria Sacchari*), the other varieties having shown themselves to be practically unsusceptible to an attack of the disease; which is a very fortunate circumstance. The disease is usually attended with disastrous consequences which are naturally more keenly felt and dreaded in the *Katara* growing centres enumerated before than in other parts of the country where the cultivation of *Katara* varieties is limited. No definite information is available as to how long the disease has been in the United Provinces, but from the evidence collected in Meerut and parts of Rohilkhand, it appears that a quarter of a century ago it was unknown, or at any rate, existed in a form not severe enough to attract serious attention. About 45 years ago the Agaul variety was imported for the first time into Meerut from Bareilly and acclimatized at Gagaul, a village within a short distance of the city of Meerut. The local name "Gagaul" or "Bareilly" for the Agaul variety owes its origin to this circumstance. From village Gagaul the seed found its passage into Muzaffarnagar where the variety soon acquired popularity.

For a number of years the variety did so remarkably well in Meerut and Muzaffarnagar that the local varieties were left in the background and the cultivation of the Gagaul extended beyond all expectation, but in the famine year, 1877-78, the crop in parts of the Meerut district was so seriously damaged by the rust fungus as to have caused great distress among the cultivators. It is stated, independently of this fact, that the disease made its first appearance in Pilibhit in the same year. Since then it has occurred in a mild or a severe form in almost all cane-growing tracts. During the past 10 or 12 years it has caused such havoc in Meerut, Rohilkhand, and Gorakhpur that the cultivation of the varieties liable to the disease has gradually fallen off year after year and they have been replaced by the different local varieties of *Ukh* whose resisting power is fully relied on. The *Katara* varieties are however, generally speaking so superior to the *Ukh* varieties in respect of the yield of sugar that a decline in the cultivation of the former owing to their well-known susceptibility to the disease cannot but be looked upon as a matter for regret. Nor can it be regarded as an inconsiderable loss to the sugar industry of the country. The disease generally makes its appearance towards the end of the rainy season, ordinarily in September, and always during the period of growth, never after the growth is completed. Thus if a crop escapes the attack till January, it is never attacked afterwards. The first noticeable symptom of an attack is a change of colour in the leaves from a dark green into a pale green which afterwards becomes lighter as the disease acquires intensity. The next thing that happens is a change in the colour of the rind of the individual internodes mainly affected which become tinged with yellow, the pith inside becoming pale at the same time. The juice loses its flavour and becomes disagreeable to the taste, besides giving off a somewhat unpleasant odour. Later on red dots or spots make their appearance in the pith of the affected part and rapidly increase in size and number. Subsequently the affected internodes shew up the juice totally

disappears, the pith becomes spongy and a black powder is formed in the inner cavity of the internodes. Few canes are, however, *completely* destroyed in this manner. Ordinarily, only a few internodes are severely damaged. These may be sometimes at the top, sometimes at the bottom, and occasionally even in the middle of the cane. So one may find a cane in which only the top part has been destroyed and the rest is only slightly diseased, or one in which only the bottom or the middle portion is seriously injured, showing that the fungus does not as a rule damage any particular part of the cane more especially than the other. But when a cane is once attacked, although only a few internodes may shrivel up, yet the remaining internodes (which do not *look* diseased) are all bound to be affected and most of them will show on dissection a number of red or dark red spots within a dirty pith. The greater the number of these spots the more unpleasant the juice is to the taste, and the less will be the amount of sugar in it. In some internodes, however, there may be no characteristic spots or abnormal colour of the pith visible to the naked eye. Internodes which are only slightly affected generally throw off new shoots from their buds or "eyes." All the canes in a clump are seldom affected, if ever, some almost always escaping the disease. When *Katara* varieties are sown mixed with *Ukh* varieties in the same field the attack of the disease is usually confined to the former, the latter remaining free.

The crop in a poor field is generally more liable to an attack than in one which in a high agricultural condition.

The character of the season and the amount of rainfall seem to have little influence on the disease, though it is stated that perhaps a dry year is more favourable for the disease than a wet year.

The cultivators do not understand the cause of the disease, and look upon it as a sort of plague for vegetable life, which they attribute to the divine displeasure. They are, however, aware that if cuttings from a diseased cane be planted the crop

obtained is sure to get the disease. No effective remedy is known. Irrigation is not uncommonly tried with indifferent results, the idea being that the disease might be due to dryness in the soil, but I have seen instances in which a field with sufficient moisture in it was severely injured. Consequently when a cultivator's crop is ruined once, he gives up the cultivation of the variety and takes to some other (resistant) variety. The only precaution taken in the matter of seed is that the internodes in which the existence of the red spots is particularly marked are picked out of the seed cuttings and thrown away, while those in which the spots are not visible are used for planting. The leaves of the affected crop are left in the field to rot and get incorporated with the soil in the natural course and the roots are not dug out or burnt. These circumstances undoubtedly lead to a continuance of the disease in the village in which it once finds its way.

In the past cold weather I sent to the Director, Botanical Department, Northern India, for identification, a few typical specimens of diseased cane from Pipra, a village in Gorakhpur, where I believed the crop had been attacked by the fungus *Trichosphaeria Sacchari*, and a copy of his report on the specimens is attached. Reference may be made to it with regard to the only remedy so far suggested.

Two coloured drawings, one showing the appearance of a healthy *Agaul* cane and the other of a diseased cane of the same variety, are also annexed.

S. M. HADI, M.B.A.C., M.B.A.S.,

*Assistant Director,*

*Land Records and Agriculture,*

*N.-W. Provinces and Oudh.*

*Dated Cawnpore, the 5th May, 1892.*

*Copy of a letter no 208, dated 21st February, 1899, from the Director of Botanical Department, Northern India, to the Director of Land Records and Agriculture, North-Western Provinces and Oudh*

I have the honour to acknowledge the receipt of your letter no 208 dated 13th February 1899, regarding a sample of diseased sugar-cane forwarded from Pipra, a village in the Gorakhpur district

I have carefully examined the specimens, and I have little doubt that the disease is due to a fungus identical with that which has lately been doing so much damage to the sugar-cane crops of the Godavari district. The description of the disease as given by Dr Bourne, of the Madras Presidency College, agrees almost exactly with the appearance of the specimens you have sent to me, the bright red tinge being very marked in cross sections of the lower portions of the stems. Dr Bourne has identified the fungus as *Trichosphaeria Sacchari*.

The only remedy suggested is the total destruction by fire of any crop found to be thus diseased, and the introduction of other varieties.

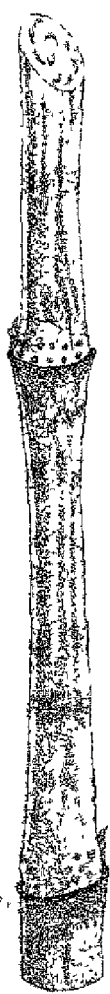
Mr Gollan informs me that the same disease has appeared in the Muzaffernagar district, and has done much damage to the variety of cane known as "Morathi"

A coloured drawing has been made by my draftsman of the Pipra variety showing the red colouring matter in a cross section of the cane.



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